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(71) Applicant  
Jarl Sundseth,  
21 Lennox Gardens,  
London S.W.1  
(72) Inventor  
Jarl Sundseth  
(74) Agents  
Lloyd Wise, Tregear &  
Co.,  
Norman House, 105—109  
Strand, London  
WC2R 0AE

(54) Pressure indicator

(57) A device which indicates when a given pressure has been exceeded, comprises a diaphragm 14 exposed to differential pressure with a central

stem 21 movable through an opening 23 in a fixed part and having a protuberance 22 preventing return of the stem to its initial position. The stem causes indicating means opposite a window 28.

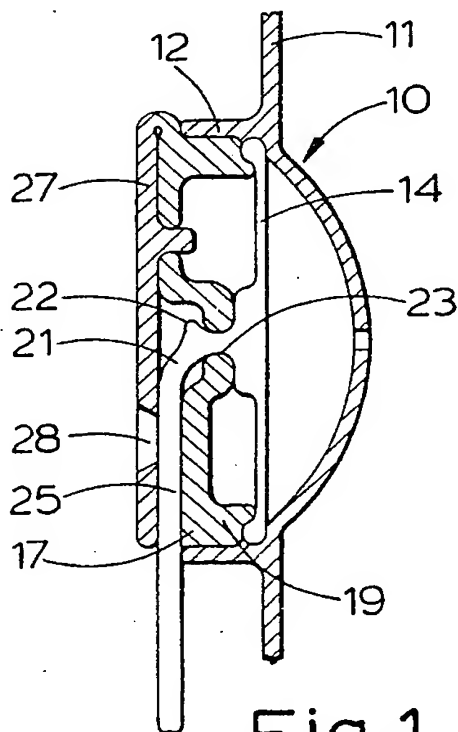


Fig.1

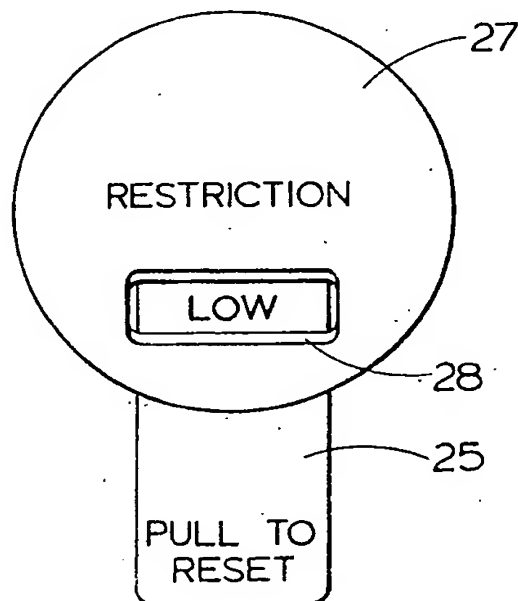


Fig.3

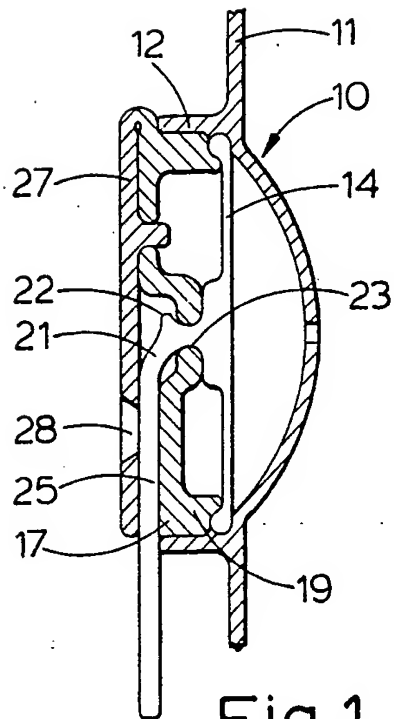


Fig.1

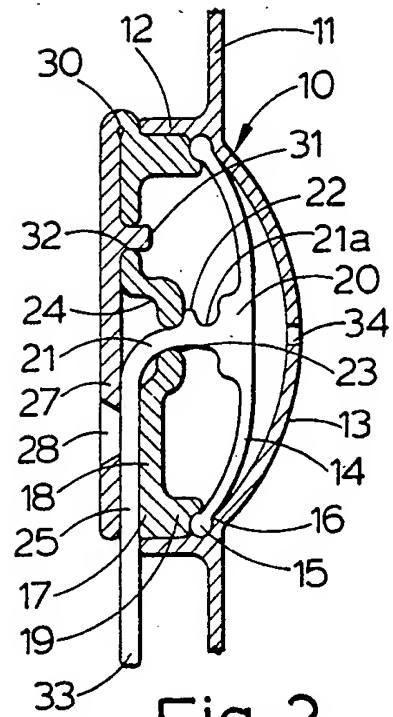


Fig.2

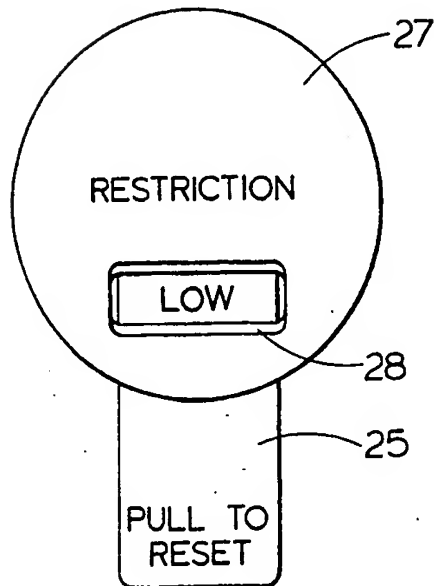


Fig.3

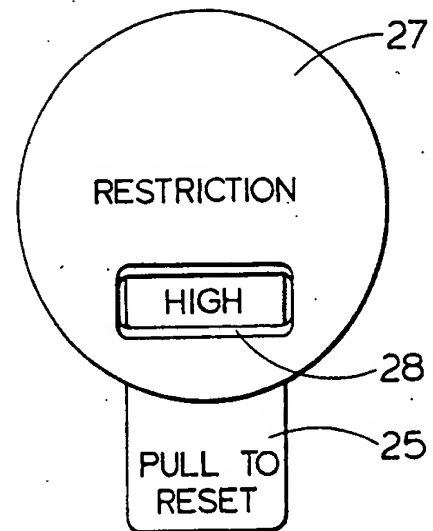


Fig.4

## SPECIFICATION

### Pressure indicator

This invention relates to pressure indicators of the kind which show when a given pressure difference has been exceeded.

The invention comprises a pressure indicator of the kind described having a diaphragm exposed to differential pressure with a central stem movable through an opening in a fixed part and having a protuberance preventing return of the stem to its initial position, and the displacement of the stem providing an external indication.

One embodiment of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figures 1 and 2 are axial sections of a pressure indicator in the initial and set condition respectively, and

Figures 3 and 4 are corresponding elevations of the front of the indicator.

Referring to the drawings, the indicator, shown generally at 10, comprises a portion of a wall 11 of a vessel, for example a filter cartridge, where the inside and outside may have different pressures. The wall 11 is formed with an outwardly projecting cylindrical mounting flange 12 and is dished at 13 within the flange. A diaphragm 14 has a circular bead 15 at its edge which is trapped between an annular ledge 16 within the flange 12 and a retainer element 17 having a base 18 and a cylindrical flange 19 fitting sufficiently closely within the mounting flange 12 as to be held in assembled condition simply by friction.

The diaphragm 14 has a central thickened portion 20 from which extends a flexible stem 21 having, spaced from the thickened portion 20, a protuberance 22. The stem 21 extends through a central opening 23 in a dished part 24 of the base 18 of the retainer element 17. The stem 21 is bent within the dished part 24; its outer end portion 25, which has the form of a strip, extends at a right angle to the axis of the indicator 10 through a slot formed in the base 18 of the retained element 17. A cover 27 extends over the base 18 to hold the stem end portion 25 within the slot. A window 28 in the cover 27 enables legends on the stem end portion 25 to be seen.

The cover 27 and retainer element 17 are preferably moulded in one piece, e.g. of polypropylene, with a hinge 30 joining them. In the as moulded condition the cover 27 and element 17 lie side by side joined by the hinge. After assembly of the diaphragm and retainer element the cover 27 is folded around its hinge 30 to overlie the base 18. A projection 31 moulded on the cover extends through a hole 32 in the base to hold the cover in assembled condition.

In an air filter, for example, the gradual clogging of the filter in service will cause a gradual increase of pressure across the filter element. Pressure within the filter downstream of the filter element is communicated to one side of the diaphragm 14 by the hole 34 in the wall 11. Until a given

differential pressure, the protuberance 22 holds the diaphragm 14 in its initial position, illustrated in Figure 1. When the given pressure is reached, the protuberance 22 snaps through the opening 23 to the Figure 2 position, and retains the diaphragm in the Figure 2 position even if pressures across it subsequently equalise. The stem 21 is sufficiently flexible to offer no resistance to this movement. The movement of the end portion 25 of the stem 21 brings the legend LOW out of the window 28 and the legend HIGH into it. This indicates to a service engineer that the filter should be cleaned or changed. If the filter is cleaned, the end 33 of the stem 21 can be pulled to reset the indicator 10, by moving the protuberance 22 back through the opening 23.

The indicator 10 is like a toggle, in having only two stable positions, shown respectively in Figures 1 and 2, by reason of the co-operation of the protuberance 22 and opening 23.

It will be appreciated that the protuberance could take other forms than that illustrated; for example it could be annular. Two or more protuberances may be used which pass through the opening 23 together.

The stem 21 has an area 21a of reduced cross-section adjacent the thickened portion 20 of the diaphragm. If the stem 21 breaks, e.g. by excessive force used to reset it, the break will occur at the point 21c and the diaphragm will remain intact.

The pressure is preset by the design of the indicator, for example a larger protuberance will need a higher pressure differential. Final adjustment can be effected by grinding the dies in which the retainer element 17 is made to enlarge the opening 23.

In a modified form of the device illustrated the single protuberance 22 may be supplemented by another spaced along the stem 21. A given pressure differential of a given value brings the first protuberance through the opening 23 and an appropriate legend into the window 28. A second predetermined pressure differential greater than the first brings the second protuberance through the opening 23, and another legend into the window.

The indicator has many uses, and is not restricted to filters.

## CLAIMS

1. A pressure indicator of the kind which shows when a given pressure has been exceeded, comprising a diaphragm exposed to differential pressure with a central stem movable through an opening in a fixed part and having a protuberance preventing return of the stem to its initial position, and the displacement of the stem providing an external indication.

2. A pressure indicator of the kind which shows when a given pressure has been exceeded comprising a housing, a diaphragm supported by the housing and sensitive to differential pressure, an opening to the housing on one side of the diaphragm, a stem on the diaphragm extending

through the opening, detent means acting to retain the stem in operated position, the stem providing an external indication of operation.

3. An indicator as claimed in Claim 2, wherein
- 5 the stem is arranged for movement through a passage and has a tab extending externally thereof, whereby to allow manual resetting of the indicator after operation.
4. An indicator as claimed in Claim 2 or
- 10 Claim 3, wherein the detent means is a protuberance on the stem co-operating with said opening.
5. An indicator as claimed in Claim 4, wherein the diaphragm stem and protuberance are a single
- 15 moulding of elastic plastics material.
6. An indicator substantially as herein described with reference to the accompanying drawings.

New claims or amendments to claims filed on 21.10.81.

- 20 Superseded claims 2.  
New or amended claims:—

2. A pressure indicator of the kind which shows when a given pressure has been exceeded comprising a housing, a diaphragm supported by
- 25 the housing and sensitive to differential pressure, an opening to the housing on one side of the diaphragm, a stem on the diaphragm extending through the opening, a protuberance on the stem forming detent means acting to retain the stem in
- 30 operated position, the stem providing an external indication of operation.